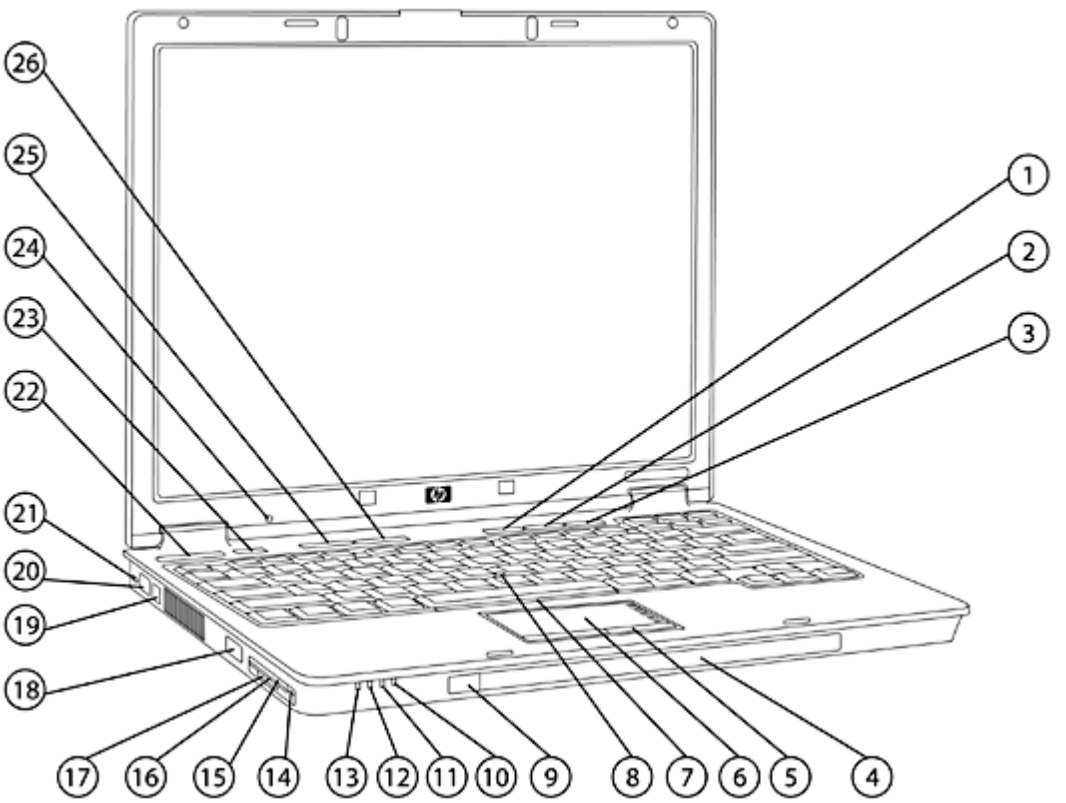
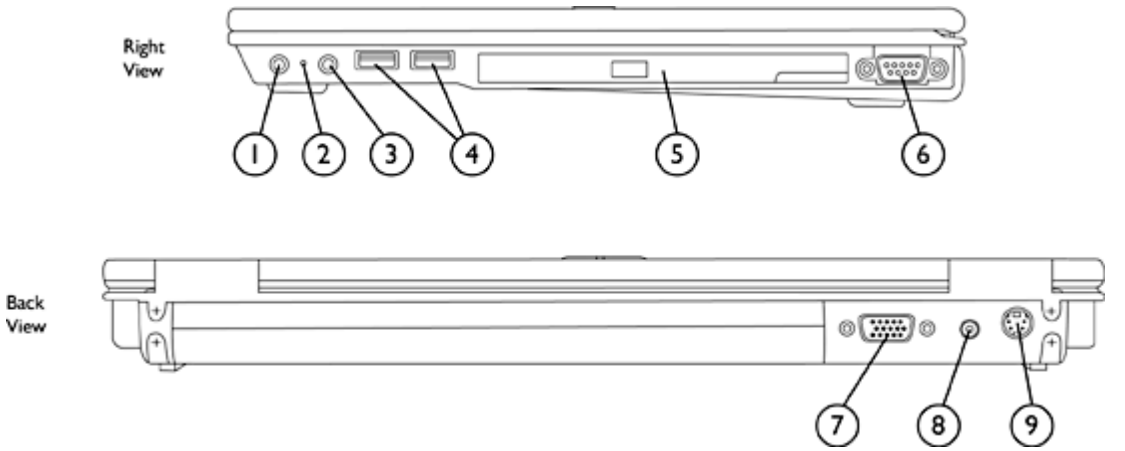
Overview



1. Volume Mute Button with LED
2. Volume Down Button
3. Volume Up Button
4. Stereo Speakers
5. Left/Right Touchpad Buttons
6. Touchpad with Scroll Zone
7. Left/Right Pointstick Buttons
8. Pointstick
9. Fast Infrared Port
10. Hard Drive Activity LED
11. Battery Charging LED
12. Power/Standby LED
13. Wireless On/Off LED
14. PC Card Eject Button
15. PC Card Slot
16. Integrated Smart Card Reader
17. Integrated Secure Digital Slot
18. USB 2.0 Port
19. RJ-11 Port (Modem)
20. RJ-45 Port (NIC)
21. Kensington Lock Slot
22. Power Button with LED
23. HP Info Centre Button
24. Ambient Light Sensor
25. Wireless On/Off Button with LED
26. Presentation Mode Button

Overview



1. Headphone Jack
2. Microphone
3. Microphone Jack
4. 2 USB 2.0 Ports
5. MultiBay II Drive with Easy Release
6. Serial Port
7. VGA/External Monitor Connector
8. DC Power Connector
9. S-Video TV Out

NOTE: This document covers features which could potentially be found in this notebook platform, please see sku specific information on what specific features are found in the standard models that HP offers.

At A Glance

- Microsoft Windows XP Professional,
  Windows XP Home Edition (select countries only), or
  FreeDOS
- Intel® Pentium® M processors 730 to 770* or Intel Celeron® M processor 370*
- Sleek industrial design starting at 4.69 lb/2.13 kg and 1.04-inch/26.5-mm thin
- 14.1-inch display
- Mobile Intel 915PM Express Chipset on nc6230 model
- Mobile Intel 915GM Express Chipset on nc6220 model
- 256-MB DDR2 SDRAM, upgradeable to 2048-MB maximum
- Up to 80-GB 5400 rpm, user-removable hard drive
- ATI MOBILITY RADEON X300 graphics controller with 32 or 64 MB of video memory (on nc6230)
- Intel Graphics Media Accelerator 900 (on nc6220 model)
- Optional integrated 802.11 a/b/g or 802.11 b/g wireless LAN module
- Support for optional Intel Centrino™ mobile technology
- Optional integrated Bluetooth®
- Integrated Secure Digital (SD) flash media slot
- Security features including integrated Smart Card Reader and optional Trusted Platform Module (TPM) Embedded Security Chip
- NetXtreme Gigabit PCI Express Ethernet Controller
- Dual pointing devices
- Support for ultra-slim MultiBay II devices
- Protected by a three-year standard parts and labour warranty – certain restrictions and exclusions apply. For details, consult the Product Information Centre at 1-888-882-6672.

*Intel's numbering system is not a measurement of higher performance.

What's Special

- Latest PCI Express technology and DDR2 400-MHz & 533-MHz memory support
- Enhanced security features:
  - HP ProtectTools
  - Integrated Smart Card Reader
  - Optional Embedded Security features
- Ease of use features:
  - Ambient light sensor
  - HP Fast Charge technology
  - HP Wireless Assistant
  - HP power down NIC technology
  - HP MultiBay II Easy Release
  - Up to 4.5 hours of battery life on the nc6220 model
  - Up to 4 hours of battery life on the nc6230 model
  - HP Mobile Print Driver for on-the-go printing
- Integrated reliability features:
  - HP Mobile Data Protection System
  - HP Panel Protection System
  - Scratch-resistant keyboard deck using In-mold Lamination
  - Magnesium-alloy display enclosure
- Support for new HP docking solutions and HP Travel Battery

Standard Features

Processors	Intel Pentium M processor 770* (2.13-GHz, 533-MHz FSB, 2-MB L2 cache) Intel Pentium M processor 760* (2.00-GHz, 533-MHz FSB, 2-MB L2 cache) Intel Pentium M processor 750* (1.86-GHz, 533-MHz FSB, 2-MB L2 cache) Intel Pentium M processor 740* (1.73-GHz, 533-MHz FSB, 2-MB L2 cache) Intel Pentium M processor 730* (1.60-GHz, 533-MHz FSB, 2-MB L2 cache) Intel Celeron M processor 370* (1.5-GHz, 400-MHz FSB, 1-MB L2 cache) * Intel's numbering is not a measurement of higher performance. NOTE:Intel Pentium M processors support enhanced Intel SpeedStep™ technology. Processor speed denotes maximum performance mode; Intel Pentium M processors will run at approximately 800 MHz in battery optimization mode.	
Operating System	Microsoft Windows XP Professional SP2 Microsoft Windows XP Home Edition SP2 (select countries only) FreeDOS NOTE: Microsoft Windows 2000 Professional is not available pre-installed, but drivers for it are downloadable from http://www.hp.com.	
Chipset	nc6220 model: Mobile Intel 915GM Express Chipset nc6230 model: Mobile Intel 915PM Express Chipset	
Graphics	nc6220 model: Intel Graphics Media Accelerator 900 with up to 128 MB of shared system memory nc6230 model: ATI MOBILITY RADEON X300 graphics controller (PCI Express) with 32 MB or 64 MB of video memory	
Display	**Internal**	14.1-inch TFT XGA (1024 x 768 resolution and 16 M colours) 14.1-inch TFT SXGA+ (1400 x 1050 resolution and 16 M colours) Ambient light sensor
	External	Up to 32-bit per pixel colour depth Supports 640 x 480, 800 x 600, 1024 x 768, 1280 x 768, 1280 x 1024, or 1600 x 1200 resolutions up to 100-Hz refresh rate, dependent upon monitor capability, and resolution and colour depth settings
Memory	**Standard**	256-MB, 512-MB, or 1024-MB 400-MHz or 533-MHz DDR2 SDRAM; two SODIMM slots
	Maximum	Upgradeable to 2048-MB maximum (1024-MB SODIMM in slots 1 and 2)
	NOTE: Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed.	

Standard Features

Communications	NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)* with HP power down NIC technology 56K modem** with digital line guard * The term "10/100/1000" or "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required. ** Designed for downloads from 56K modem compliant sources. Maximum achievable download transmission rates currently do not reach 56 KB/s, and will vary with line conditions. Modem availability is subject to country regulatory approval.
Wireless Devices	Support for a broad range of secure, integrated wireless LAN options. Integrated Bluetooth is also an option (factory configurable only) and can be combined with any one of the supported wireless LAN options.
All integrated wireless LAN options	Wi-Fi certified Cisco Compatible Extensions support (Version 3.0) Wired Equivalent Privacy (WEP) support up to 128-bit keys Wi-Fi Protected Access (WPA) and WPA2 support 802.1x authentication support, including EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, and LEAP WiFi certified for WPA2, WMM Advanced Encryption Standard (AES) support Dual antennas integrated in the display enclosure
Broadcom 802.11b/g WLAN	Integrated support for 802.11 b and g Up to 54-mbps data rate
Broadcom 802.11a/b/g WLAN	Integrated support for 802.11a, b and g Up to 54-mbps data rate
Intel PRO/Wireless 2200BG 802.11 b/g WLAN	Intel Centrino mobile technology Integrated support for 802.11b and g Up to 54-mbps data rate
Intel PRO/Wireless 2915ABG 802.11 a/b/g WLAN	Intel Centrino mobile technology Integrated support for 802.11a, b and g Up to 54-mbps data rate
Integrated Bluetooth	Bluetooth Specification v1.2 compliant Works with a wide range of Bluetooth devices
Keyboard	The 101/102-key compatible keyboard features an industry standard, full-pitch key layout with desktop keyboard features, such as the isolated inverted-T cursor control keys, editing keys, both left and right control and alt keys, and 12 function keys. US and International key layouts are available. Other features include an integrated numeric keypad, hotkeys for instant access to power conservation, brightness, and other features, 19-mm x 19-mm key pitch (centre-to-centre spacing), 2.5-mm stroke, comfort-dished keycaps, and bright key legends for improved visibility in low light conditions.
One-Touch Productivity Buttons	Provide one-touch access to the following features: HP Info Centre, Wireless On/Off, Presentation Mode, Volume Up, Volume Down, and Volume Mute

Standard Features

Pointing Devices	Dual Pointing devices – Touchpad with scroll zone and Pointstick Both devices have two buttons.		
Expansion Card Slots	One Type I/II PC Card Slot	Supports 32-bit CardBus and 16-bit PC Cards	
	One Integrated Smart Card Reader	Compatible with ISO 7816 compliant Smart Cards PC/SC interface support	
Media Slots	One Integrated Secure Digital Slot	Supports SD (Secure Digital) and MMC (MultiMedia Card) media	
Storage	Hard Drives	40-, 60-, 80-GB 5400 rpm SMART 60-GB 7200 rpm SMART	
	NOTE: These hard drives are customer removable and will withstand multiple insertion/removal cycles.		
	Optical Drives	MultiBay II (9.5-mm)	DVD-ROM MultiBay II Drive DVD/CD-RW Combo MultiBay II Drive DVD+/-RW MultiBay II Drive
	Second Hard Drive	MultiBay II (9.5-mm)	80-GB 5400 rpm MultiBay II Hard Drive
Interfaces	PC Card Slot	One – Type I/II	
	Smart Card Reader	One	
	External Monitor	One – VGA	
	External Microphone	One	
	Headphone/Line out	One	
	Power Connector	One	
	RJ-11 (Modem)	One	
	RJ-45 (NIC)	One	
	Ambient Light Sensor	One	
	Fast Infrared Port	One (4-Mb/s support) IrDA 4-MB compliant; IR performance will vary depending on performance of IR peripherals and application used.	
	Serial Port	One	
	S-Video TV Out	One (Support for NTSC/PAL)	
	USB 2.0	Three	
	Docking Connector	One	
	Travel Battery Connector	One	
	LED Status Indicators	Eleven	

Standard Features

Audio

ADI AC '97 CODEC
Integrated 16-bit Sound Blaster Pro compatible audio
Integrated stereo speakers
Integrated microphone
External volume up, volume down, and mute buttons
Stereo headphone/line out
Stereo microphone in

Software

Preloaded Software for Microsoft Windows XP

Adobe Acrobat Reader
HP Local Recovery provided by Altiris*
HP One-Touch Button Software
HP Mobile Print Driver
Synaptics Touchpad Driver
HP Help and Support
HP ProtectTools Security Manager:
- BIOS Configuration for HP ProtectTools
- Credential Manager for HP ProtectTools

HP Wireless Assistant
Sonic RecordNow! (for optional DVD+/-RW and DVD/CDRW drives)*
Symantec Norton Antivirus with complimentary 60-day live update
Intervideo WinDVD – DVD Player (for optional DVD+/-RW, DVD/CDRW and DVD drives)*

Software on CD

Intervideo WinDVD Creator – DVD Authoring (for optional DVD+/-RW drives)

Additional software available from the Web

HP Client Manager Software
HP ProtectTools Security Manager:
- Embedded Security for HP ProtectTools
- Smart Card Security for HP ProtectTools

* Software is loaded on the hard drive and must be installed by running the Software Setup utility.

System Recovery for Microsoft Windows XP systems only

Each unit is shipped with a recovery kit containing Operating System Recovery and Driver/Application Recovery discs. These discs allow users to either recover or repair the notebook operating system and select drivers without losing personal data. The Operating System disc also provides the option of reinstalling the operating system software provided with the notebook.

Client Management Software

HP Client Manager Software (CMS) provides asset tracking, alerting, diagnostics, and SoftPaq distribution for HP business desktops, notebooks, and workstations. HP CMS is the foundation for HP Client Management Solutions. For more information and to download HP Client Manager Software, please refer to the HP website at http://www.hp.com/go/easydeploy.

HP Local Recovery Provided by Altiris

Provides data and system file protection for HP business PCs to enable fast recovery of information that is accidentally deleted or if the system becomes corrupted. Designed for disconnected or seldom-connected users, Local Recovery protects your HP computer's data and system state by taking scheduled snapshots, which are then stored in a protected area on the local hard disk. System backup and disaster recovery is now simple and fast for all users, regardless of connectivity. For more information and to download, please refer to the HP website at http://www.hp.com/go/easydeploy.

Standard Features

HP ProtectTools Security Manager	HP ProtectTools Security Manager is the security platform for business notebooks and desktops. The HP ProtectTools Security Manager is an extensible client security console that delivers enhanced security capabilities through add-on software modules. Modules currently available are: - Smart Card Security for HP ProtectTools - BIOS Configuration for HP ProtectTools - Embedded Security for HP ProtectTools - Credential Manager for HP ProtectTools

Security	**Standard Features**		Configuration Control Hardware Memory Change Alert Ownership Tag Setup Password Power-On Password Drivelock Enabled for PC Smart Card options Kensington Lock Slot
		Integrated Smart Card Reader	Compatible with ISO 7816 compliant Smart Cards PC/SC interface support
	Optional Features	**TPM Embedded Security Chip**	Designed to the Trusted Computing Group (TCG) standard Microsoft Crypto API and PKCS#11 software interface support RSA Secured Partner program certification NOTE: Full functionality of the TPM Embedded Security Chip is available only with Windows XP Professional.
	For more information on HP security solutions refer to http://www.hp.com/go/security.		

Power Supply	External 65-watt slim AC adapter, 6-foot (1.8-metre) power cord included. Total length including External AC adapter is 12 feet (3.66 metre). HP Fast Charge Technology

Battery	**Primary Battery**	6-cell high capacity Lithium-Ion (52Wh)
	Optional Travel Battery	8-cell high capacity Lithium-Ion (52Wh)

Battery Life	**Primary Battery**	nc6220: Up to 4 hours and 30 minutes nc6230: Up to 4 hours
	Primary Battery and optional HP Travel Battery	nc6220: Up to 9 hours and 15 minutes nc6230: Up to 8 hours
	NOTE: Battery life will vary depending on the product configuration, product model, applications loaded on the product, power management settings of the product, and the product features used by the customer. As with all batteries, the maximum capacity of this battery will decrease with time and usage.	
System Standby Time	Up to 1 week	

Standard Features

Power Conservation	Supports enhanced Intel SpeedStep technology with Intel Pentium M processors (allows Battery Optimized Mode, Maximum Performance Mode, or Automatic mode) Intel Display Power Saving technology on nc6220 ATI PowerPlay technology on nc6230 HP power down NIC technology Hibernation Standby ACPI compliance
MultiBay II Devices	MultiBay II devices may be swapped with the system powered on (hot) under Microsoft Windows XP Professional, Windows XP Home, or Windows 2000 (except MultiBay II secondary hard drive).
Docking	HP Docking Station HP Advanced Docking Station HP's shared docking solutions provide simple and convenient port replication and cable management. Features include Gigabit NIC pass through, modem pass through, legacy parallel and serial ports, DVI, S-video TV out, USB 2.0 ports, integrated security mechanism*, integrated MultiBay II** and ExpressCard** slots. These docking solutions are compatible across multiple Business Notebook platforms enabling a lower total cost of ownership. * HP/Kensington Cable Lock required (purchased separately) ** HP Advanced Docking Station only
Service and Support	HP Services includes a three-year standard parts and labour warranty, pick-up or carry-in, and toll-free 7 x 24 hardware technical phone support. On-site service and warranty upgrades are also available. NOTE: Certain restrictions and exclusions apply. For details, consult the Product Information Centre at 1-888-882-6672. http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp.
Select Model(s)	

Standard Features

nc6220 PU982AW#ABA (English) PU982AW#ABC (Fr CAN)	**Processor**	Intel Pentium M processor 740* (1.73-GHz, 533-MHz FSB, 2-MB L2 cache)
	Operating System	Microsoft Windows XP Professional
	System Memory	512-MB 400-MHz DDR2 SDRAM (512-MB SODIMM in slot 1)
	Hard Drive	40-GB 5400 rpm
	Display	14.1-inch colour TFT XGA with (1024 x 768) resolution (up to 16.7 M colours internal)
	Graphics	Intel Graphics Media Accelerator 900 with up to 128 MB of shared system memory
	Audio	ADI AC '97 CODEC, Line out/headphone and microphone jacks
	Optical Drive	9.5-mm DVD/CD-RW Combo
	Communications	56K Fax/Modem, Integrated NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)
	Integrated Wireless	Intel PRO/Wireless 2200BG 802.11b/g WLAN Bluetooth
	TPM Embedded Security Chip	Yes
	Integrated Smart Card Reader	Yes
	Pointing Device	Dual pointing devices (both Pointstick and Touchpad)
	Battery	6-cell high capacity Lithium-Ion (52Wh)
	Power	External 65W adapter
	Warranty	3/3/0

nc6220 PU983AA#ABA (English) PU983AA#ABC (Fr CAN) SMARTBUY MODEL	**Processor**	Intel Pentium M processor 740* (1.73-GHz, 533-MHz FSB, 2-MB L2 cache)
	Operating System	Microsoft Windows XP Professional
	System Memory	512-MB 400-MHz DDR2 SDRAM (512-MB SODIMM in slot 1)
	Hard Drive	40-GB 5400 rpm
	Display	14.1-inch colour TFT XGA with (1024 x 768) resolution (up to 16.7 M colours internal)
	Graphics	Intel Graphics Media Accelerator 900 with up to 128 MB of shared system memory
	Audio	ADI AC '97 CODEC, Line out/headphone and microphone jacks
	Optical Drive	9.5-mm DVD/CD-RW Combo
	Communications	56K Fax/Modem, Integrated NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)
	Integrated Wireless	Intel PRO/Wireless 2200BG 802.11b/g WLAN
	TPM Embedded Security Chip	Yes
	Integrated Smart Card Reader	Yes
	Pointing Device	Dual pointing devices (both Pointstick and Touchpad)
	Battery	6-cell high capacity Lithium-Ion (52Wh)
	Power	External 65W adapter

Standard Features

	Warranty	3/3/0

nc6230 PU984AW#ABA (English) PU984AW#ABC (Fr CAN)	Processor	Intel Pentium M processor 750* (1.86-GHz, 533-MHz FSB, 2-MB L2 cache)
	Operating System	Microsoft Windows XP Professional
	System Memory	512-MB 400-MHz DDR2 SDRAM (512-MB SODIMM in slot 1)
	Hard Drive	60-GB 5400 rpm
	Display	14.1-inch colour TFT XGA with (1024 x 768) resolution (up to 16.7 M colours internal)
	Graphics	ATI MOBILITY RADEON X300
	Video Memory	64 MB
	Audio	ADI AC '97 CODEC, Line out/headphone and microphone jacks
	Optical Drive	9.5-mm DVD/CD-RW Combo
	Communications	56K Fax/Modem, Integrated NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)
	Integrated Wireless	Intel PRO/Wireless 2200BG 802.11b/g WLAN Bluetooth
	TPM Embedded Security Chip	Yes
	Integrated Smart Card Reader	Yes
	Pointing Device	Dual pointing devices (both Pointstick and Touchpad)
	Battery	6-cell high capacity Lithium-Ion (52Wh)
	Power	External 65W adapter
	Warranty	3/3/0

nc6230 PU985AA#ABA (English) PU985AA#ABC (Fr CAN) SMARTBUY MODEL	Processor	Intel Pentium M processor 750* (1.86-GHz, 533-MHz FSB, 2-MB L2 cache)
	Operating System	Microsoft Windows XP Professional
	System Memory	512-MB 400-MHz DDR2 SDRAM (512-MB SODIMM in slot 1)
	Hard Drive	60-GB 5400 rpm
	Display	14.1-inch colour TFT XGA with (1024 x 768) resolution (up to 16.7 M colours internal)
	Graphics	ATI MOBILITY RADEON X300
	Video Memory	64 MB
	Audio	ADI AC '97 CODEC, Line out/headphone and microphone jacks
	Optical Drive	9.5-mm DVD/CD-RW Combo
	Communications	56K Fax/Modem, Integrated NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)
	Integrated Wireless	Intel PRO/Wireless 2200BG 802.11b/g WLAN
	TPM Embedded Security Chip	Yes
	Integrated Smart Card Reader	Yes
	Pointing Device	Dual pointing devices (both Pointstick and Touchpad)

Standard Features

	Battery	6-cell high capacity Lithium-Ion (52Wh)
	Power	External 65W adapter
	Warranty	3/3/0

nc6230 PU986AA#ABA (English) PU986AA#ABC (Fr CAN)	Processor	Intel Pentium M processor 760* (2.0-GHz, 533-MHz FSB, 2-MB L2 cache)
	Operating System	Microsoft Windows XP Professional
	System Memory	1024-MB 400-MHz DDR2 SDRAM (512-MB SODIMM in slot 1 and slot 2)
	Hard Drive	60-GB 5400 rpm
	Display	14.1-inch colour TFT XGA with (1024 x 768) resolution (up to 16.7 M colours internal)
	Graphics	ATI MOBILITY RADEON X300
	Video Memory	64 MB
	Audio	ADI AC '97 CODEC, Line out/headphone and microphone jacks
	Optical Drive	9.5-mm DVD/CD-RW Combo
	Communications	56K Fax/Modem, Integrated NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)
	Integrated Wireless	Intel PRO/Wireless 2915ABG 802.11a/b/g WLAN Bluetooth
	TPM Embedded Security Chip	Yes
	Integrated Smart Card Reader	Yes
	Pointing Device	Dual pointing devices (both Pointstick and Touchpad)
	Battery	6-cell high capacity Lithium-Ion (52Wh)
	Power	External 65W adapter
	Warranty	3/3/0

*Intel's numbering system is not a measurement of higher performance.

Options

Memory	256-MB 533-MHz DDR2 SDRAM	PE830A
	512-MB 533-MHz DDR2 SDRAM	PE831A
	1024-MB 533-MHz DDR2 SDRAM	PE832A
MultiBay II Storage (9.5 mm)	8X DVD-ROM MultiBay II Drive	PA849A
	24X Combo DVD/CD-RW MultiBay II Drive	PA850A
	4X DVD+/-RW Dual Format MultiBay II Drive	PA851A
	80-GB 5400 rpm MultiBay II Hard Drive	PH357A
Other Storage	60-GB 5400 rpm Primary Hard Drive	PA852A
	HP 40-GB Mobile USB Hard Drive	DQ549A
	HP USB Digital Drive + 128MB Secure Digital Card	DL702A
	HP USB Diskette Drive	DC361B
Communications	Intel PRO/Wireless 2200BG 802.11 b/g WLAN option kit	PF952AA#ABA
Expansion Solutions	HP Docking Station	PA286A#ABA
	HP Advanced Docking Station	PA287A#ABA
	HP Monitor Stand	PA507A
	HP Adjustable Notebook Stand	PA508A
	HP External MultiBay II (9.5-mm)	PA509A#ABA
	HP 4-port USB 2.0 Hub	DG954A
Power	HP 2-bay Battery Charging Station	DT533A#ABA
	HP 10-bay Battery Charging Station	DT534A#ABA
	Battery Adapter kit #1	PK402A
	65W AC Adapter	DC359A#ABA
	90W AC Adapter	DC895B#ABA
	90W Auto Adapter	DC303B
	90W Air/Auto/AC Combo Adapter	DV574A#ABA
	90W Aircraft Cables	DC899A
	Primary 6-cell Battery Pack	PB994A
	HP Travel Battery	PB993A
Carrying Cases	HP Entry Value Case	DL617A
	HP Top Load Nylon	DC915A
	HP Executive Leather Case	PA847A
	HP Sport Backpack	DG102A

Options

Security	PC Card Smart Card Reader	DC350B
	Smart Card Bulk Pack (1-100)	DR032A
	HP/Kensington Cable Lock	PC766A
Input/Output Devices	USB/PS2 Keyboard	DC852A#ABA
	USB/PS2 Keyboard (French)	DC852A#ABC
	USB/PS2 Optical Mouse	DC369A
	HP USB Optical Travel Mouse	F2100A

Memory

Up to 2048 MB of 400-MHz or 533-MHz DDR2 SDRAM
Two DIMM slots
DIMM sizes supported: 256 MB, 512 MB, or 1024 MB

Standard Memory

- 256 MB (256 MB x 1)
- 512 MB (512 MB x 1 or 256 MB x 2)
- 1024 MB (1024 MB x 1 or 512 MB x 2)

Optional Memory Upgrades

Support for up to 2048 MB of memory is available (with the installation of optional DDR2 SDRAM memory kits)

Up to	Slot 1	Slot 2
768 MB	512 MB	256 MB
1024 MB	1024 MB	Empty
1024 MB	512 MB	512 MB
1280 MB	1024 MB	256 MB
1536 MB	1024 MB	512 MB
2048 MB	1024 MB	1024 MB

NOTE: This chart does not represent all possible memory configurations. Due to the non-industry standard nature of some third-party memory modules, we strongly recommend using only HP branded memory modules to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed.

Memory Upgrades

1024-MB 533-MHz DDR2 SDRAM	PE832A
512-MB 533-MHz DDR2 SDRAM	PE831A
256-MB 533-MHz DDR2 SDRAM	PE830A

Removable Media Drive Support

	Quantity Supported	Drive Bay
DVD+/-RW MultiBay II Drive*	One	MultiBay II
DVD/CD-RW Combo MultiBay II Drive*	One	MultiBay II
DVD-ROM MultiBay II Drive*	One	MultiBay II

Hard Drive Support

	Quantity Supported	Drive Bay
60-GB 7200 rpm SMART Hard Drive	One	Dedicated hard drive bay
80-GB 5400 rpm SMART Hard Drive*	Up to two	Dedicated hard drive bay and/or MultiBay II
60-GB 5400 rpm SMART Hard Drive	One	Dedicated hard drive bay
40-GB 5400 rpm SMART Hard Drive	One	Dedicated hard drive bay

* MultiBay II drives supported in the internal MultiBay II are also supported in the optional HP External MultiBay II and the HP Advanced Docking Station.

System Unit	Dimensions (H x W x D)	1.04 (at front) x 12.4 x 10.1 in (26.5 (at front) x 315 x 257 mm)	
	Weight	nc6220 with MultiBay II weight saver	4.69 lb (2.13 kg)
		nc6220 with MultiBay II DVD optical drive	4.99 lb (2.26 kg)
		nc6230 with MultiBay II weight saver	4.82 lb (2.19 kg)
		nc6230 with MultiBay II DVD optical drive	5.12 lb (2.32 kg)
	NOTE: Height varies depending upon where on the notebook the measurement is made. Weight includes 6-cell battery, 40-GB hard drive, 256-MB memory, 14.1-inch XGA display, 802.11 wireless communications module, and TPM Embedded Security Chip. Weight varies by configuration and components.		
	Stand-Alone Power Requirements	Nominal Operating Voltage	18.5 V
		Average Operating Power	nc6220: 22 W nc6230: 24.5 W
		Max Operating Power	< 65 W
	Temperature	Operating	32° to 95° F (0° to 35° C) (not writing optical)
			41° to 95° F (5° to 35° C) (writing optical)
		Non-operating	-4° to 140° F (-20° to 60° C)
	Relative Humidity	Operating	10% to 90%, non-condensing
		Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
	Shock	Operating	125 G, 2 ms, half-sine
		Non-operating	200 G, 2 ms, half-sine
	Random Vibration	Operating	0.75 grms
		Non-operating	1.50 grms
	Altitude (unpressurized)	Operating	-50 to 10,000 ft (-15.24 to 3,048 m)
		Non-operating	-50 to 40,000 ft (-15.24 to 12,192 m)
	Industry Standard Certifications	Blue Angel	No
		UL	Yes
		Energy Star Compliant	Yes
		ICES	Yes
		TUV GS	Yes
		Australia / NZ Compliance	Yes
		CCC	Yes
		Japan Compliance	Yes
		MIC	Yes
		BSMI	Yes
		CE Marking Compliance	Yes
		KONCAR	Yes
		GOST	Yes
		SASO	Yes

		SABS	Yes
		UKRSERTCOMPUTER	Yes
65W External AC Adapter	Weight	0.62 lb (0.28 kg) (adapter)	
		0.29 lb (0.13 kg) (power cord)	
	Dimensions	4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm)	
	Input	Operating Input Voltage	100 to 240 VAC
		Operating Input Current	1.7A at 90 VAC 0.85A at 180 VAC
		Operating Frequency Range	47 to 63 Hz AC
		Efficiency	83% minimum at 115 VAC
	Output	Output Power	65 W
		DC Output Current	18.5 V
	Environmental	Operating Temperature	32° to 104° F (0° to 40° C)
		Non-operating (storage) Temperature	-4° to 149° F (-20° to 65° C)
		Altitude	0 to 10,000 ft (0 to 3,048 m)
		Humidity	20% to 80%
		Storage Humidity	10% to 90%
	EMI and Safety Certifications	CE Mark: full compliance with LVD and EMC directives Worldwide safety standards: IEC950, EN60950, UL1950, Class2, SELV Agency approvals: C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCIB, NOM-1 NYCE	
	MTBF	Over 200,000 hours at 25°C ambient condition	
52Wh Primary Lithium-Ion Battery Pack	Dimensions (H x W x L)	0.8 x 2.1 x 8.0 in (2.0 x 5.3 x 20.3c m)	
	Weight	0.681 lb (0.315 kg)	
	Cells/Type	6-cell Lithium-Ion	
	Energy	Voltage	10.8 V
		Amp-hour Capacity	4.8Ah
		Watt-hour Capacity	52Wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (-10° to 60° C)
		Non-operating	-4° to 140° F (-20° to 60° C)
	Battery Re-Charge Time	System in OFF Mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)
		HP Fast Charge Technology	Charges the battery up to 90% within 1.5 hours when system is OFF

Technical Specifications

Optional 52Wh Travel Battery	Dimensions (H x W x L)	1.0 x 3.9 x 8.7 in (2.5 x 10.0 x 22.0 cm)	
	Weight	1.00 lb (0.455 kg)	
	Cells/Type	8-cell Lithium-Ion	
	Energy	Voltage	14.4 V
		Amp-hour Capacity	3.6Ah
		Watt-hour Capacity	52Wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (-10° to 60° C)
		Non-operating	-4° to 140° F (-20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	3 hours
		System ON	3 to 5 hours (depending on system power consumption)
	Fuel Gauge	When pressed, LEDs light indicating level of charge remaining on battery	

14.1-Inch Colour TFT XGA Display	Active Area (W x H)	11.2 x 8.4 in (28.6 x 21.4 cm)	
	Diagonal Size	14.1 in (35.7 cm)	
	Surface Treatment	Anti-glare	
	Number of Colours	Up to 16 M	
	Contrast Ratio	250:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	150 nit (typical) NOTE: Brightness is listed as an average measurement and may vary among panels.	
	Pixel Resolution	Pitch	0.279 mm
		Format	1024 x 768
		Configuration	RGB Stripe
	Backlight	CCFL	
	PPI	91	
	Character Display	80 x 25	
	Total Power Consumption	5.3 W	
	Viewing Angle	±40° Horizontal, +10°/-30° Vertical (typical)	

Technical Specifications

14.1-Inch Colour TFT SXGA+ Display	Active Area (W x H)	11.2 x 8.4 in (28.6 x 21.4 cm)	
	Diagonal Size	14.1 in (35.7 cm)	
	Surface Treatment	Anti-glare	
	Number of Colours	Up to 16 M	
	Contrast Ratio	250:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	180 nit (typical) NOTE: Brightness is listed as an average measurement and may vary among panels.	
	Pixel Resolution	Pitch	0.204 mm
		Format	1400 x 1050
		Configuration	RGB Stripe
	Backlight	CCFL	
	PPI	124	
	Character Display	80 x 25	
	Total Power Consumption	5.2 W	
	Viewing Angle	±45° Horizontal, +15°/-35° Vertical (typical)	

Hard Drives

60-GB 7200 rpm	Drive Weight	0.25 lb (113 g)	
	Capacity	60 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-6	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	1 ms
		Average	10 ms
		Maximum	18 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	117,210,240	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Features	ATA Security	

Technical Specifications

80-GB 5400 rpm	Drive Weight	0.22 lb (99 g)	
	Capacity	80 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-6	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	156,301,488	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Features	ATA Security	
60-GB 5400 rpm	Drive Weight	0.22 lb (99 g)	
	Capacity	60 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-6	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	117,210,240	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Features	ATA Security	
40-GB 5400 rpm	Drive Weight	0.22 lb (99 g)	
	Capacity	40 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-6	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	78,140,160	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Features	ATA Security	

Removable Storage Drives - MultiBay II

DVD-ROM MultiBay II Drive	Dimensions	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)	
	Weight	0.34 lb (155 g)	
	Access Times	Random	<120 ms CD
			<170 ms DVD
	Max Data Transfer Rate	24X-CD-ROM	3,600 KB/s
		8X-DVD	10,800 KB/s
	Transfer Mode	Multiword DMA Mode 2	
	Interface	EIDE	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW	
	Supported Media (write)	None	
	Max Media Capacity (read)	4.7 GB	
	Transport	Tray Loading	
DVD/CD-RW Combo MultiBay II Drive	Dimensions	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)	
	Weight	0.45 lb (205 g)	
	Access Times	Random	<120 ms CD
			<155 ms DVD
	Max Data Transfer Rate	24X CD-ROM	3,600 KB/s
		8X DVD	10,800 KB/s
		24X CD-R	3,600 KB/s
		24X CD-RW	3,600 KB/s
	Transfer Mode	Multiword DMA Mode 2	
	Interface	EIDE	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW	
	Supported Media (write)	CD-R, CD-RW	
	Max Media Capacity (read)	4.7 GB	
	Max Media Capacity (write)	700 MB	
	Transport	Tray loading	

Technical Specifications

DVD+/-RW MultiBay II Drive	Dimensions	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)	
	Weight	0.45 lb (205 g)	
	Access Times	Random	<150 ms CD
			<125 ms DVD
	Max Data Transfer Rate	24X CD-ROM	3,600 KB/s
		8X DVD	10,800 KB/s
		24X CD-R	3,600 KB/s
		10X CD-RW	1,500 KB/s
		2.4X DVD+R	3,240 KB/s
		2.4X DVD+RW	3,240 KB/s
		2X DVD-R	2,700 KB/s
		2X DVD-RW	2,700 KB/s
	Transfer Mode	Multiword DMA Mode 2	
	Interface	EIDE	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW	
	Supported Media (write)	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW	
	Max Media Capacity (read)	4.7 GB	
	Max Media Capacity (write)	4.7 GB	
	Transport	Tray Loading	

80-GB 5400 rpm MultiBay II Hard Drive	MultiBay II Drive Adapter	Dimensions (H x W x D)	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)
		Weight	0.16 lb (72 g)
	Drive Weight	0.22 lb (99 g)	
	Capacity	80 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-6	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	156,301,488	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Features	ATA Security	

Audio

Hardware	**Implementation**	ADI AC '97 CODEC
	Volume Controls	Up, down, and mute buttons
	Full Duplex	Yes
	Sound Blaster Pro compatible	Yes
	Microphone Jack	Stereo or mono
	Headphone/Line Out Jack	Stereo
Audio Output Quality	**Frequency Response**	20 Hz - 20 kHz
	Signal to Noise Ratio	>85 dB
	Total Harmonic Distortion	0.01%
	Noise Floor	-110 dB
	Play/Record Sampling Rate(s)	7 kHz - 48 kHz
	AD/DA Resolution	16 bit
Internal Speakers	**Power Rating**	2 Watts
	Impedance	4 Ohms

Communications

Integrated Broadcom NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)	**Ethernet Features**	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3z and 802.3ab; IEEE 802.3 clauses 34-42) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s IEEE 802.1p QoS (Quality of Service) Support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)
	Power Management	ACPI 1.1a compliant -- multiple power modes Situation-sensitive features reduce power consumption NIC Battery Saving Mode (enabled by default)
	Performance Features	TCP/IP/UDP Checksum Offload (configurable) Microsoft Large Send Offload (configurable) TCP Segmentation Offload CPU Task Offload Adaptive Interrupts

	Manageability	Wake-on-LAN from all Power-Managed States (configurable; Magic Packet and Microsoft Wake-Up Frame) PXE 2.0 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Cable Analyzer
	NIC Device Driver Name	Broadcom NetXtreme Gigabit Ethernet
	Drivers Available	Microsoft Windows XP Microsoft Windows 2000
Agere Systems AC'97 Modem	Form Factor	MDC Daughtercard
	Power Management Support	APM Revision 1.2, ACPI
	Approvals/ Certifications	UL, CSA, NEMKO, CCIB, Industry Canada, FCC Part 68, CTR21, FCC Part 15 Class B, Canadian ICES-003 Class B, C.I.S.P.R.22, Australian ACA, CE Mark, Other Countries
	Data Mode Capabilities	56K modem (a-law, mu-law) V.8bis V.80 V44, V.42bis, MNP5 (Compression) V.42 (LAPM, MNP2-4) (Error Correction) V.34 (file date: 10/96) Optional symbol rates: 2800, 3429 Asymmetric Symbol rates Synchronous primary channel data signaling rates: 3600, 31200 Automatic rate re-negotiation V.32bis V.32 V.23 V.22bis V.22 V.21 Bell 212A Bell 103J
	Fax Mode Capabilities	TIA/EIA-578-B (Class 1) T.30, T.4 (Group 3) V.17 V.29 V.27ter V.21 Channel 2

	Command Set	V.250 (Partial) TIA-602 Identification: +GMI, +GMM, +GMR Port control: +IPR, +ICF, +IFC, +ILRR Modulation: +MS, +MR, +MA Error control: +ES, +ER, +EB, +ESR, +ETBM Data compression: +DS, +DR V.251
Broadcom 802.11b/g WLAN	Wireless LAN Standards	IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant (details at www.hp.com/go/notebooks/WLAN)
	Frequency Band	2.4 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
	Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
	Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program).
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
	Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points.
	Output Power (for CKK)[2]	17.5 dBm +/- 1.5 dB
	Output Power (for OFDM; power varies by data rate)[2]	13.5 dBm +/- 1.5 dB
	Power Consumption	Transmit: 2.0 W (max) Receive: 1.5 W (max) Idle mode: 248 mW (nominal) Sleep mode: 20 mW (max)
	Power Management	ACPI compliant power management 802.11 Compliant Power Saving Mode
	Receiver Sensitivity[3]	54 Mbps: -72 dBm,1 Mbps: -94 dBm
	Antenna type	High efficiency dual band antenna with polarization diversity, mounted in the display enclosure
	Range	802.11 b – Typical (@1 Mbps): 1200 feet – Outdoor Open Area; 300 feet – Indoor, Office environment 802.11 g – Typical (@1 Mbps): 1200 feet – Outdoor Open Area; 300 feet – Indoor, Office environment

Form Factor	MiniPCI Type IIIB	
Weight	0.026 lb (12 g)	
Dimensions	0.20 x 1.75 x 2.34 in (4.9 x 44.6 x 59.8 mm)	
Operating Voltage	3.3v	
Temperature	Operating Non-operating	32° to 122° F (0° to 50° C) -14° to 158° F (-10° to 70° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 15,000 ft (4,572 m) 0 to 40,000 ft (12,192 m)
Configuration Utility[4]	Choice of Configuration Utility: • Microsoft Windows XP Wireless Network Connection Manager • Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
4. WLAN supplier's client utility is required for Cisco Compatible Extensions support. WLAN may also be compatible with certain third-party software supplicants.

Broadcom 802.11a/b/g WLAN	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified Cisco Compatible Exensions Program compliant (details at www.hp.com/go/notebooks/WLAN)
	Frequency Band	2.4 GHz and 5 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
	Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
	Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program).
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
	Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points
	Output Power (for CKK)[2]	17.5 dBm +/- 1.5 dB

Output Power (for OFDM; 13.5 dBm +/- 1.5 dB power varies by data rate)[2]		
Power Consumption	Transmit: 2.0 W (max) Receive: 1.5 W (max) Idle mode: 248 mW (nominal) Sleep mode: 20 mW (max)	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[3]	802.11a - 54 Mbps: -70 dBm; 802.11g - 54 Mbps: -72 dBm, 1 Mbps: -94 dBm	
Antenna type	High efficiency dual band antenna with polarization diversity, mounted in the display enclosure	
Range	802.11 a – Typical (@6 Mbps)	1000 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
Form Factor	MiniPCI Type IIIA	
Weight	0.035 lb (16 g)	
Dimensions	0.19 x 2.00 x 2.35 in (4.8 x 50.95 x 59.75 mm)	
Operating Voltage	3.3v	
Temperature	Operating Non-operating	32° to 122° F (0° to 50° C) -14° to 158° F (-10° to 70° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 15,000 ft (4,572 m) 0 to 40,000 ft (12,192 m)
Configuration Utility[4]	Choice of Configuration Utility: • Microsoft Windows XP Wireless Network Connection Manager • Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
4. WLAN supplier's client utility is required for Cisco Compatible Extensions support. WLAN may also be compatible with certain third-party software supplicants.

Intel PRO/Wireless 2200BG 802.11b/g WLAN	**Wireless LAN Standards**	IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified Cisco Compatible Exensions Program compliant (details at http://www.hp.com/go/notebooks/wlan)
	Frequency Band	2.4 GHz

Technical Specifications

Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps	
Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM	
Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program).	
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.	
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK	
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
Roaming	IEEE 802.11 compliant roaming between access points.	
Output Power (for CKK)[2]	16 dBm +/- 2 dB	
Output Power (for OFDM; power varies by data rate)[2]	15 dBm +2/-5 dB	
Power Consumption	Transmit: 1.8 Watts (max) Receive: 1.4 Watts (max) Idle mode: 75 mW (nominal) Sleep mode: 60 mW	
Power Management	ACPI compliant power management 802.11 Compliant Power Saving Mode	
Receiver Sensitivity[3]	54 Mbps: -72 dBm, 11 Mbps: -88 dBm , 1 Mbps: -97 dBm	
Antenna type	High efficiency dual band antenna with polarization diversity, mounted in the display enclosure	
Range	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
Form Factor	MiniPCI Type IIIB	
Weight	0.026 lb (11.75 g) (max)	
Dimensions	0.20 x 1.75 x 2.34 in (4.9 x 44.6 x 59.8 mm)	
Operating Voltage	3.3v	
Temperature	Operating Non-operating	32° to 158° F (0° to 70° C) -40° to 176° F (-40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)

	Configuration Utility[4]	Choice of Configuration Utility: • Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support) • Microsoft Windows XP Wireless Network Connection Manager

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
4. WLAN supplier's client utility is required for Cisco Compatible Extensions support. WLAN may also be compatible with certain third-party software supplicants.

Intel PRO/Wireless 2915ABG 802.11a/b/g WLAN	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified Cisco Compatible Exensions Program compliant (details at www.hp.com/go/notebooks/WLAN)
	Frequency Band	2.4 GHz and 5 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
	Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
	Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program).
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
	Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points
	Output Power (for CKK)[2]	16 dBm +/- 2 dB
	Output Power (for OFDM; power varies by data rate)[2]	15 dBm +2/-5 dB
	Power Consumption	Transmit: 1.8 Watts (max) Receive: 1.4 Watts (max) Idle mode: 100 mW (nominal) Sleep mode: 60 mW (max)
	Power Management	ACPI compliant power management 802.11 Compliant Power Saving Mode
	Receiver Sensitivity[3]	54 Mbps: -72 dBm, 11 Mbps: -89 dBm , 1 Mbps: -97 dBm
	Antenna type	High efficiency dual band antenna with polarization diversity, mounted in the display enclosure

	Range	802.11 a – Typical (@6 Mbps)	600 feet – Outdoor Open Area 150 feet – Indoor, Office environment
		802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
		802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	Form Factor	MiniPCI Type IIIB	
	Weight	0.026 lb (11.75 gm) (max)	
	Dimensions	0.20 x 1.75 x 2.34 in (4.9 x 44.6 x 59.8 mm)	
	Operating Voltage	3.3v +/- 10%	
	Temperature	Operating Non-operating	32° to 176° F (0° to 80° C) -40° to 176° F (-40° to 80° C)
	Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
	Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
	Configuration Utility[4]	Choice of Configuration Utility: • Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support) • Microsoft Windows XP Wireless Network Connection Manager	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
4. WLAN supplier's client utility is required for Cisco Compatible Extensions support. WLAN may also be compatible with certain third-party software supplicants.

Bluetooth by HP	Name	HP Integrated module with Bluetooth wireless technology
	Bluetooth Specification	1.2 Compliant
	Dimensions	1.02 x 0.55 x 0.22 in (26 x 14 x 5.7 mm)
	Frequency Band	2402 to 2480 MHz
	Number of available channels	79 (1 MHz) available channels
	Data Rates and throughput	1 Mbps data rate; throughput up to 720 Kbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Asynchronous Connection Less links 723.2 kbps/57.6 kbps asymmetric or 433.9 kbps symmetric
	Transmit Power	-6 dBm to 4 dBm (Bluetooth Class II)
	Receiver Sensitivity	Better than -80 dBM at 0.1 % raw bit error rate
	Power Consumption	Peak (Tx) 264 mW Peak (Rx) 231 mW Sleep <1 mW
	Antenna	Internally integrated within module
	Range	Up 33 ft (10 m)
	Electrical Interface	USB 1.1 compliant

	Microsoft Windows Plug and Play compliant	
OS Support	Microsoft Windows XP Professional and Home	
	Microsoft Windows 2000	
Bluetooth Software Supported	Widcomm Bluetooth for Windows	
	Microsoft Windows XP Bluetooth Software	
Link Topology	Point to Point, Multipoint Pico Nets up to 7 slaves	
Security	Full support of Bluetooth Security Provisions	
Power Management	Microsoft Windows ACPI, and USB Bus Support	
	Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff	
Certifications	All necessary regulatory approvals for supported countries, including:	
	FCC (47 CFR) Part 15C, Section 15.247 & 15.249	
	ETS 300 328, ETS 300 826	
	Low Voltage Directive IEC950	
	UL, CSA, and CE Mark	
Temperature	Operating	-4° to 158° F (-20° to 70° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
Humidity	Operating	10% to 90%
	Non-operating	5% to 95%
Altitude	Operating	15,000 ft (4,572 m)
	Non-operating	40,000 ft (12,192 m)
Bluetooth Profiles Supported	(with Bluetooth for Windows 4.0 software)	
	Serial Port Profile (SPP)*	
	Dial-Up Networking (DUN)*	
	Generic Object Exchange Profile (GOEP)	
	Object Push Profile (OPP)*	
	File Transfer Profile (FTP)	
	Synchronization Profile (SYNC)	
	Hard Copy Cable Replacement (HCRP)*	
	Personal Area Networking Profile (PAN)*	
	Human Interface Device Profile (HID)*	
	FAX Profile (FAX)	
	Basic Imaging Profile (BIP)	
	Headset Profile (HSP)	
	Hands Free Profile (HFP)	
	Advanced Audio Distribution Profile (A2DP)	

* indicates the profile is also supported by Microsoft Windows XP SP2

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